SOHO CONTINGENCY SCRIPT CS-07A
Warm Startup Recovery
(SOHO Server/SCRIPTS/CTGNCY SCRIPTS (OE-CTRLD)/ CS-07A/WSU Recovery)

Version 8.2

Based on: CR# G1341, MOCR# 99-0458, SOHO User's Manual: DH_WM_RC
Change Record:

1.0 28 Sep 99 – Updated script for gyroless operations. HWB
1.1 04 Oct 99 – Changed filter value for reaction wheel speed monitoring from 2 to 3. Changed delta for daily pulse from 31 to 30 seconds. Changed value for TC watchdog from 48 to 24 hours. Added note to only enable CRP flag monitoring and reaction wheel speed monitoring if AOCS mode is NM or RMW. Added note to only enable experiment offpointing monitoring if AOCS mode is NM or at SOC request. Added text indicating use of macro 36. HWB
1.2 22 Nov 99 – Listed procedures called by x_warm_tmck. Changed procedure name for setting OBT to k_tai_hex*yy* as a generic usage. Added warning to skip enabling Hx monitoring until fixed. Put step and procedure name in italics for enabling Hx monitoring. HWB
1.3 16 Dec 99 – Added word filter in change record for version 1.1. Added None to Additional Scripts Required and FDF Activities. Added MACRO34_35 to list of loads required. Added notification to not proceed with recovery until directed by the Programme Office. Added hex data word for distributing OBT to all users. Changed filter value for experiment offpointing warning from 3 to 2 in reload of gyroless patch. Added additional macro load to zero out macros 34 and 35. Added note to step loading and enabling min/max monitoring that PROS A and B surveys are loaded and enabled. HWB
2.0 18 Oct 00 – Added constraint to perform ESR recovery first if there is a concurrent ESR and warm startup. HWB CR# 1542
2.1 30 Oct 00 – Added SOHO User's Manual procedure to Based on line.
3.0 6 Dec 00 – Deleted comment about setting reaction wheel speed monitoring limits for maneuver. HWB CR# 1578. MOCR# 00-0206.
4.0 4 Jun 02 – Added line to set OBT on CDMU B before running procedure x_warm_tmck. Added text to description of x_warm_tmck in step 2 describing addition of context memory operations. HWB CR# 1783, MOCR# 02-0086.
5.0 13 Nov 02 – Added load for changing macro 11. Updated comments for k_mnmx_load. Added flow chart for determining cause of reconfiguration as an attachment. Added references to new contingency scripts CS-07C and CS-07D. HWB CR# 1822, MOCR# 02-0148.
5.1 9 Dec 02 – Removed references to new contingency scripts CS-07C and CS-07D. HWB
5.2 2 Apr 03 – Corrected diagram in Attachment 1.
6.0 12 Sep 03 – Added VIRGO weekly load and NONCOHO load to list of loads. Added setting watchdog to 72 hours for keyhole periods in text description for x_warm_rec. Added check of clock accuracy and clock correction after x_warm_rec and before v_fl_synchr. Added indication that daily pulse could also end in 9E. Added 5 minutes of NRT for CDS

prior to subformat 5 transition. Added timing note to v_fl_synchr. Added commands to enable the corrective actions for thermal monitoring and TR thermal monitoring. Changed COMS Backup Recovery load name to RF_SWITCH21_YYDDD and added new load name RF_SWITCH12_YYDDD. CR# 1928, MOCR# 03-0128, OCD# 1839. Added step to stop MDI structure per OCD# 1849. HWB

6.1 10 Nov 03 – Combined conditions 2 and 3 for declaring spacecraft emergency. NJP

7.0 13 Jan 05 – Added transition to medium rate on CDMU B if using a 34m or 70m downlink station. Added MDI commanding prior to transition to medium rate. Added procedure to load/enable std mon ch 24/25 and macro 34 and enable COBS ESR protections on CDMU B. Added note to monitor FPSS Sun presence telemetry during execution of x_warm_rec. Added contingency box to initiate ESR if FPSS loses the Sun. Added procedure to load/enable std mon ch 24/25 and macro 34 as part of ESR protection restoral. Removed load to zero out macros 34 and 35 before restoring full standard monitoring definitions. Added note to monitor FPSS Sun presence telemetry while restoring standard monitoring channels. Added uplink of intermittent recording patch. CR# 2022, MOCR# 01-0118 HWB.

7.1 31 Jan 05 – Added two VIRGO commands in step 1. Removed MDI sequence stop procedure from step 2. Added 8 hour boundary information for reloading VIRGO science load. Added new time-tag load for VIRGO prior to running v_fl_synchr. Added option to transition to subformat 6 after loading patch. OCD# 1997 HWB.

8.0 19 Feb 08 – Updated load names. Added direction to close log monitor during recovery. Changed name of OBT procedure to k_tai_hex. Added indication to pass ESR warning flag data word to procedure k_cfg_cdmub. Added procedure to upload TCMs in Macros patch. Updated load names for k_stdmon_load. Added option to use CDS procedure to prepare instrument for submode change. Added procedures to upload and enable reaction wheel speed monitoring limits update patch. Added load names for noncoho loads. CR# 2260, MOCR# 07-0030 HWB

8.1 10 Mar 08 – Added indication of hex data word to pass with k_cfg_cdmub, info on frozen packet processing, transition to LR before starting x_warm_rec, and k_hx_mn_stp vice k_hx_mn_strt.

8.2 21 Mar 08 – Added line to run k_ky_stdmon as needed if in keyhole.

Positions Required: OE, SA, CA, FDF, ESA Support Team

Anomaly Indications:

1. Loss of telemetry for approximately 1 minute; after the automatic reconfiguration, telemetry will be in low rate.
2. Modules of the CDMU, RTUs, and the communication subsystem will be switched according to the KRCG, PRCG, and communication backup sequences.
3. OBT reset and counting up from zero.
4. RMS mode, active one failure (KKSCRRMS = ACT.1FAI)
5. Software start mode, warm (KKSWSMOD = WARM)

Loads:

MACRO34_35, MACRO34, NOM_HGA_YYDDD, RF_SWITCH12_YYDDD, RF_SWITCH21_YYDDD, FSM19990830120000, FSM19990830125959, FSM20070322000001, FSM20070322000002, MACRO_ZERO, MACRO_DEF, STDMN_DEF, MACRO_NEW, PATCH_SF5, PATCH_SF6, FSM20040819000001, FSM20070322000006, FSM20070322000007, FSM20070322000008, VIRGO weekly load, NONCOHO_YYDDD, STDMN32_ENA_YYDDD, STDMN32_DIS_YYDDD, (KEYHOLE: STDMN30_ENA_YYDDD, STDMN30_DIS_YYDDD, STDMN31_ENA_YYDDD), TTVIRGO_PMOA_YYDDD

Main Activities:

1. Configure ground system for low rate telemetry
2. Preliminary checkout/data collection
3. DHSS reconfiguration
4. Restore COBS ESR protection
5. Upload and activate COBS gyroless patch
6. Restore COBS nominal configuration

Additional Scripts Required: None

Plots Required: None

FDF Activities: None

Constraints:

AFTER A UNIT FAILURE IN THE CDMU, THE OPERATIONAL CONFIGURATION SHALL NOT CROSS STRAP THE PCCS AND THE PMS. THIS ALLOWS THE KRCG TO RECONFIGURE TO A BACKUP CONFIGURATION PREVENTING A POSSIBLE CHILLY STARTUP.

BEFORE LEAVING SPACECRAFT UNATTENDED, THE COBS GYROLESS FUNCTIONS SHALL BE UPLOADED ON CURRENT ACTIVE CDMU (A OR B) AND REACTIVATED WITH ADEQUATE SETTINGS TO RECOVER FULL AOCS ON BOARD PROTECTION.

IF A CONCURRENT ESR AND WARM STARTUP HAVE OCCURRED, GIVE PRIORITY TO THE ESR RECOVERY INCLUDING TRANSITION TO CRP AND ROLL ATTITUDE DETERMINATION (CS-06A ESR RECOVERY, STEPS 1-12).

Declare a SPACECRAFT EMERGENCY when one of the following is true:

1. We have tried to acquire the spacecraft with a 26-meter antenna for more than 15 minutes. If we can not get telemetry in 15 minutes tell the DSN Ops Chief that we are in a contingency and ask if he can make 34-meter resources available. If not, declare an emergency immediately so we can gain access to 34-meter antennas (declaring an emergency will give the Ops Chief more leverage to get SOHO the resources needed).

2. We have Low Rate telemetry but there does not appear to be adequate DSN coverage to recover the spacecraft nominally. Tell the DSN Ops Chief that we are in a contingency situation and ask if DSN support can be extended. If the DSN Ops Chief cannot make more resources available, declare an emergency immediately.

	Pos	Activity C'est du gateau	Procedure
1		**STEP 1: CONFIGURE GROUND SYSTEM FOR WARM STARTUP AND TRANSITION TO MEDIUM RATE**	
2	**FOT**	Close log monitor window on CC workstation	
3		Configure MDI for transition from low rate to medium rate telemetry (OCD# 1997)	**m_fl_lrtomr**
4		Send command to close VIRGO PMOB cover **WAIT** at least 3 minutes (MR transition okay during this WAIT) Send command to open VIRGO PMOA cover. (OCD# 1997)	**/VZML, 8005** **/VZML, 800C**
5		For 34m/70m downlink stations, transition DHSS from LR to MR telemetry on LGA.	**/CMD KNK1ET21**
6		For 26m downlink stations, set BARM Timeout to 75 seconds. Configure ground system for low rate telemetry.	**o_config_lr(y)**
7		**CONTINGENCY:** If DSN ground station cannot lock on telemetry, switch back from MR to LR telemetry.	/CMD KNK1ET10
8		Set BARM Timeout to 75 seconds. Configure ground system for low rate telemetry.	o_config_lr
9			
10		**STEP 2: PRELIMINARY CHECKOUT/DATA COLLECTION**	
11		Set OBT on CDMU B.	**k_tai_hex**
12		Configure ESR protections on CDMU B - Load std mon ch 24/25 and macro 34 to monitor FPSS Sun presence. LOAD NAMES: **MACRO34_35, MACRO34** - Enable ESR monitoring and ESR warning functions (**use same receivers as before warm startup, get data word from board in IMOC and pass inside quotes**)	**k_cfg_cdmub("xxxx")**
13		Verify initial configuration and collect data for failure investigation. Unlock context memory log and reauthorize use of context memory. **NOTE**: Answer "No" to procedure queries for dump images or to return to the nominal group.	**x_warm_tmck**

14		Determine probable cause of warm startup using the flowchart in attachment 1. Excel spreadsheet representation of the flowchart is available in the OE Tools folder on the SOHO server. The file name is DHSS Error Search. Refer to HAM checklist to process frozen packets.	
15		**DO NOT PROCEED UNTIL DIRECTED BY PROGRAMME OFFICE**	
16			
17		**STEP 3: DHSS RECONFIGURATION**	
18		Transition to low rate telemetry in preparation for upcoming CDMU reconfiguration recovery	**/CMD KNK1ET10**
19		Start procedure to recover the DHSS for nominal operations Reconfigure to nominal units. If nominal units do NOT work, proceed as directed in **d_cdmu_reconfig** **NOTE:** 1. CDMU reconfiguration is done with mode 1/2 commands and will be done without telemetry. 2. Select configurations in order from 1 to 8, unless directed otherwise by OCD from ESA. 3. The configuration for operations is constrained to NOT cross strapping the PCCS and PMS. **CAUTION:** Until the ESR protections have been enabled monitor FPSS Sun presence and FDE ESR telemetry.	**x_warm_rec**
20		**CONTINGENCY (Step 3 ONLY):** **IF** the FPSS loses the Sun, trigger ESR immediately. If an ESR is triggered enable ESR warning function and switch OFF LV B.	x_esr_trig
21		Set OBT (**k_tai_hex**) Configure RTU for operations or perform RTU failure search (**k_rtu_flsch**). Set TC watchdog limit to 3 hours (**k_set_doglim**) Recover from COMS backup (**r_combu_rc**) LOAD NAMES: NOM_HGA_YYDDD, RF_SWITCH21_YYDDD (If NOT IN HGA Keyhole) RF_SWITCH12_YYDDD (If IN HGA Keyhole) Set TC watchdog limit to 24 (72 for keyhole periods) hours (**k_set_doglim**) Define KRCG/PRCG for reconfiguration to redundant units Define COMS backup configuration Define functions authorized/inhibited at warm startup Switch to nominal PDU command registers, enable command validation	

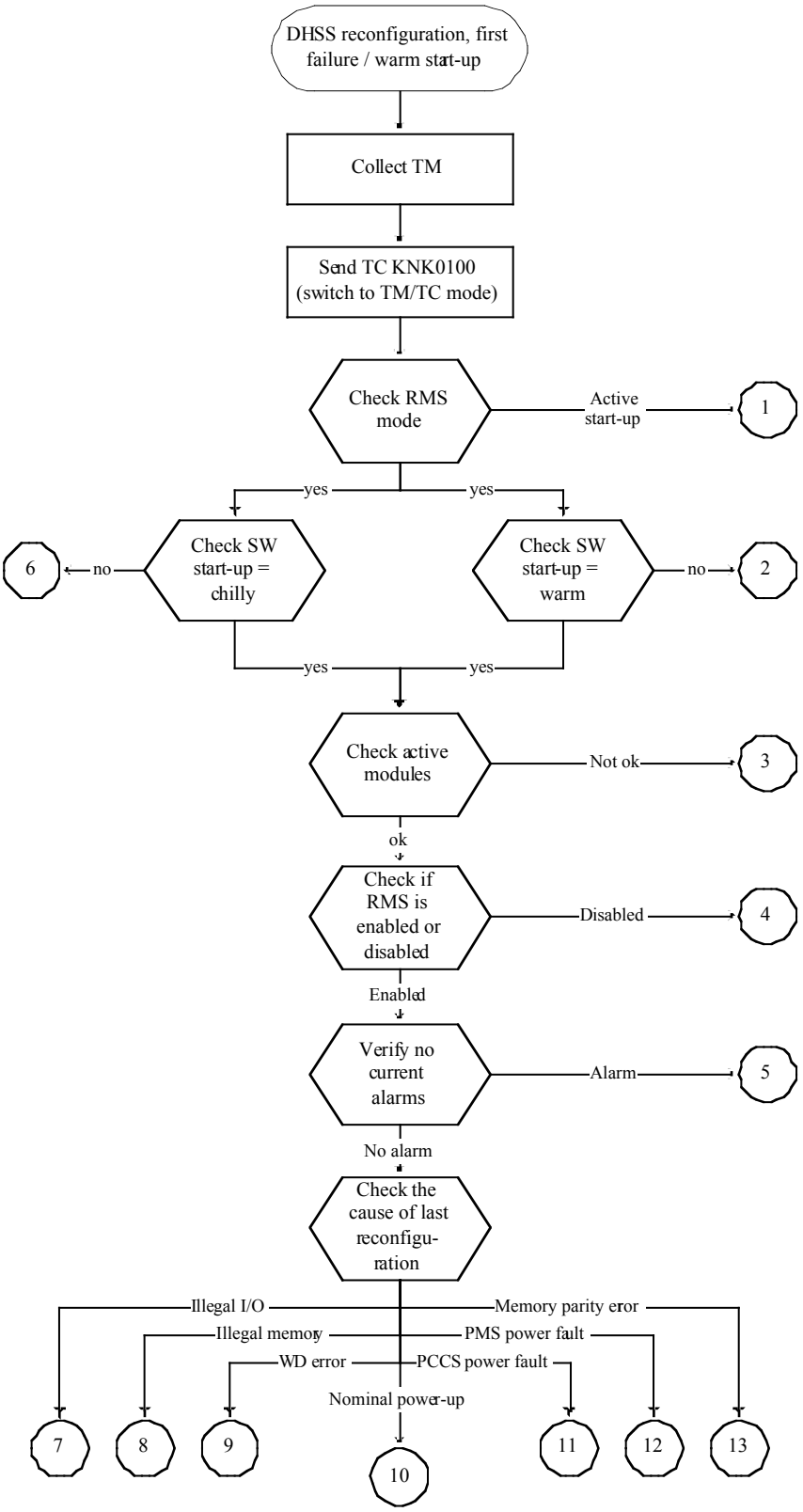
		Unlock context memory log Reauthorize use of context memory	
22		Enable ground function to check onboard clock accuracy	**o_clkcorr**
23		Correct clock discrepancy	**k_obt_init** **or** **k_obt_cor1**
24			
25		**STEP 4: RESTORE COBS ESR PROTECTION**	
26		Load standard monitoring channels 24/25 and macro 34 to monitor FPSS Sun presence. LOAD NAMES: **MACRO34_35, MACRO34**	**k_ld_mon_2425**
27		Define and enable ESR Warning Flag function **NOTE:** If warm startup occurred during a maneuver, set list of ESR warning flag recipients as specified for maneuver safing.	**k_set_esrwarn**
28		Enable ESR monitoring function	**k_esr_mn_aut**
29			
30		**STEP 5: UPLOAD AND ACTIVATE COBS GYROLESS PATCH**	
31		Uplink and activate COBS gyroless patch - Disable old functions, corrective actions and warm startup status - Upload patch and verify - Set filter values for gyroless functions CRP flag monitoring = 1 Hx monitoring = 3 Reaction wheel speed monitoring = 3 Experiment offpointing warning = 2 ACU reset monitoring = 3 **LOADS: FSM19990830120000, FSM19990830125959**	**k_gl_upld**
32		Ensure Hx monitoring is disabled	**k_hx_mn_stp**
33		Enable ACU reset monitoring	**k_acur_mon_strt**

34		Enable CRP flag monitoring **NOTE:** Only enable if AOCS mode is NM or RMW	**k_crp_mon_strt**
35		Enable reaction wheel speed monitoring	**k_rwmn_dlyadj**
36		Enable experiment offpointing monitoring with same set of instruments configured as before the reconfiguration **NOTE:** Only enable if AOCS mode is NM or at SOC request.	**k_expop_mn_strt**
37			
38		**STEP 6: RESTORE COBS NOMINAL CONFIGURATION**	
39		Verify/enable: - Ram scrubbing - OBDH bus recovery - USO monitoring - Select SSR - Convolutional coding	**k_sw_config**
40		Verify/enable time tag commanding	**k_ttag_ck**
41		Before next 8 hour boundary (0000, 0800, 1600) reload VIRGO science load with all commands after that boundary. Continue executing script while load is being built. (OCD# 1997)	**o_dlydload**
42		Define/enable experiment LCL monitoring	**k_expmon_load**
43		Define/enable substitution heater LCL monitoring	**k_subsmon_load**
44		Uplink TCMs in Macros patch **LOADS: FSM20070322000001, FSM20070322000002**	**k_patch_macro**
45		Define/enable standard monitoring **LOADS: MACRO_ZERO, MACRO_DEF, STDMN_DEF, MACRO_NEW** **NOTE:** Standard monitoring is disabled for the duration of this procedure. Monitor the FPSS Sun presence telemetry.	**k_stdmon_load**
46		**IF** in HGA Keyhole, set up standard monitorings as needed, per sequence listed in nominal ops script "Keyhole Configuration"	**k_ky_stdmon**
47		**CONTINGENCY (during k_stdmon_load ONLY):** **IF** the FPSS loses the Sun, trigger ESR immediately.	a_esr_init

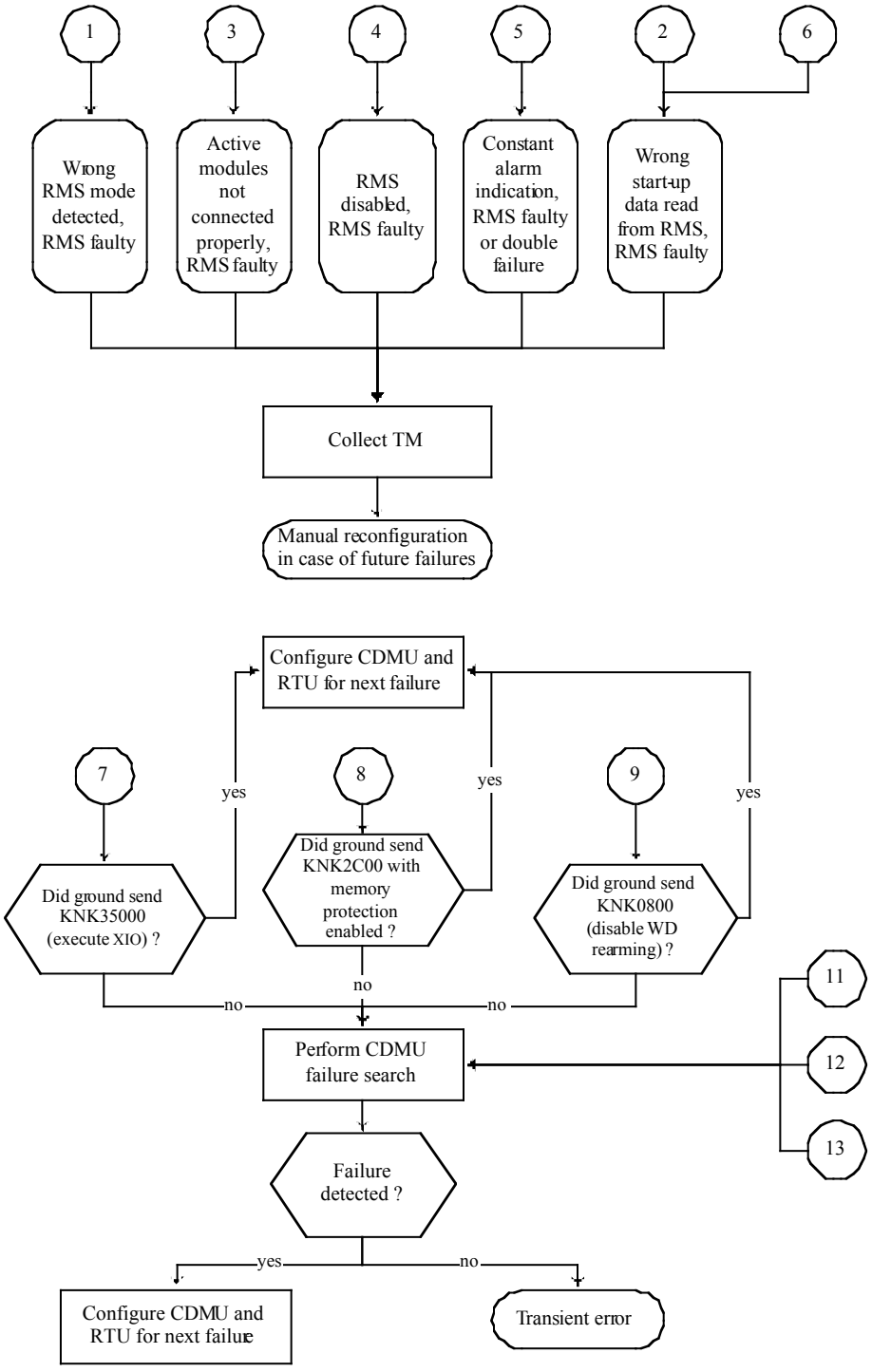
48		Define/enable min/max monitoring	**k_mnmx_load**
49		Define daily pulse time and enable **NOTE:** Set daily pulse time as TAI midnight plus 30 seconds	**k_daily_pulse ("xxxx","xx1E") or ("xxxx","xx9E")**
50		Define programmable subformat (subformat 5) **LOAD NAME: PATCH_SF5**	**k_sub5_load**
51		Enable NRT for 5 minutes for CDS to prepare for subformat transition **OR** Execute procedure to prepare CDS for subformat transtion	**o_nrt_ena** OR **c_fl_submode_prep**
52		Disable NRT	**o_nrt_dis**
53		Switch to subformat 5	**k_tm_subform5**
54		Load subformat 1 patch (subformat 6) **LOAD NAME: PATCH_SF6**	**k_patch_sf6**
55		Query SOC to determine if a transition to subformat 6 is required. **NOTE:** If CDS crashed, NRT needed for CDS recovery, when convenient. (OCD# 1997)	**k_tm_subform6**
56		**NOTE:** Patches for subformats 2 and 3 should be restored before using either subformat operationally.	
57		Load intermittent recording patch **LOAD: FSM20040819000001**	**k_ptch_intrec**
58		Load reaction wheel speed monitoring update patch **LOADS: FSM20070322000006, FSM20070322000007, FSM20070322000008**	**k_patch_rwsl_upd**
59		Enable reaction wheel speed monitoring limits update function	**k_rwslupd_ena**
60		Uplink load for commanding receiver 1 noncoherent during non-keyhole periods **LOADS: NONCOHO_YYDDD, STDMN32_ENA_YYDDD, STDMN_32_DIS_YYDDD, (KEYHOLE: STDMN30_ENA_YYDDD, STDMN30_DIS_YYDDD, STDMN31_ENA_YYDDD)**	**o_dlydload**
61		Enable ground function to check onboard clock accuracy	**o_clkcorr**
62		Correct clock discrepancy **NOTE:** Upon completion, verify only OBT frequency adjustments expected before proceeding (no further fine phase corrections).	**k_obt_init** **or** **k_obt_cor1**

63		Distribute OBT to listed subsystems	k_obt_dist(AOCS, CDS, CELIAS, CEPAC, GOLF, LASCO, MDI, SUMER, SWAN, UVCS)
64		Uplink VIRGO TT load to close PMOA cover (VZML, 8004) at 2354 and open PMOA cover (VZML, 800C) at 0015. **LOAD NAME: TTVIRGO_PMOA_YYDDD** (OCD# 1997)	o_dlydload
65		Enable VIRGO resync with daily pulse **NOTE:** Procedure **must** be complete by 2354. (OCD# 1997)	v_fl_synchr
66		Enable thermal monitoring and TR thermal monitoring corrective actions at ESA direction	KNK58ENA KNK5EENA
67			
68		SCRIPT COMPLETE	
69			

Attachment 1: Recovery Scheme after DHSS Automatic Reconfiguration (1 of 3)



Attachment 1: Recovery Scheme after DHSS Automatic Reconfiguration (2 of 3)



Attachment 1: Recovery Scheme after DHSS Automatic Reconfiguration (3 of 3)